

**DEPARTMENT OF NATURAL RESOURCES
2011-2013 CAPITAL DEVELOPMENT BUDGET**

**MAJOR PROJECT PROGRAM STATEMENT
PART 1 – PROGRAM REQUIREMENTS**

**RECONSTRUCT THE MONTELLO DAM, ACCESS ROAD, BOAT LANDING
AND FISHING PIERS**

MONTELLO DAM (ANDY KRAKOW PUBLIC FISHING AREA)

**Site Mailing Address: Wautoma DNR Office
427 East Tower Drive, Suite 100, Wautoma, WI 54982**

CITY OF MONTELLO, MARQUETTE COUNTY

Prepared & Initiated By: Thomas A. Nigus, Steven Schrage, Dave Stertz January 2010

Approved:

Regional Wildlife Supervisor Date

Regional Land Leader Date

Region Representative Date

Bureau of Facilities & Lands Date

Facilities & Lands Representative Date

Secretary's Office Date

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Background

In 1962, the State of Wisconsin accepted the transfer of numerous properties on the upper Fox River from the federal government (U.S. Army Corps of Engineers). These properties included former navigation locks (one operating at the time), dams and dikes, canals, dredge-bank islands and associated property and improvements. The Wisconsin Conservation Commission (now Dept. of Natural Resources) was the agency responsible for management of these sites which were converted to boat landings and shore-fishing sites for access to the Fox River. One of these sites is the Montello Dam (today a/k/a Andy Krakow Public Fishing Area). The site is owned and managed by the Dept. of Natural Resources (DNR). The shore-fishing and picnic areas are leased to Marquette County to operate as a public park while historically, the road on the dike and the boat landing there had been leased to the City of Montello to be maintained for public access to Buffalo Lake. The DNR retained responsibility for the operation of the dam and maintenance of its structures. The Montello Dam is classified as a large dam, but is considered a low hazard dam in that loss of life is not anticipated from a dam failure. Minor damage to property downstream could be expected from a dam failure.

The Montello Dam was originally constructed in 1855 to improve navigation between Montello and Portage by raising Buffalo Lake. The existing rock-filled timber crib dam and lock were constructed in 1933. In 1968, a six inch thick concrete cap and a six inch high fixed wooden flashboard crest were provided over the existing timber crib spillway. It is not known when the lock gates and timber lining were removed from the lock or when sluice gates were installed on the upstream end of the lock (at least prior to 1964 according to photo records). The dike (also referred to as the dredge-bank) has been treated with upstream rip-rap, and trees and brush have been removed at various times. In 1987, the City of Montello constructed a boat landing on the dike with parking on its adjoining property. On several occasions, the city has also improved the road surface on the dike for access to the boat landing.

The Montello Dam includes all of the following structures: 1) a 188 foot long concrete capped, uncontrolled overflow spillway with six inch fixed wooden flashboards, 2) a 37.3 foot wide gated auxiliary spillway (former lock) with three central, vertical sluice gates (7.9 feet high X 6.0 feet wide) with mechanical lifting devices, and two outer, stop-log sluice gates that must be operated by hand, and 3) a 2,523 foot long earth dike. There is a strip of natural ground between the overflow spillway and the auxiliary spillway that is about 90 feet wide.

This dam creates the 2,210 acre Buffalo Lake. The dam is within the city limits of Montello. A boat landing on the dike provides access to Buffalo Lake. It is the only boat access site on the east end of the lake, is heavily used, and is considered an important asset for the City of Montello. The next nearest access site is about 5 miles west of Montello on the north shore of the lake. The earthen dike exhibited structural problems following the floods on the Fox River system in June 2008.

In June 2008, severe flooding of the Fox and Montello Rivers resulted in re-routing traffic for several days from State Highway 22 across this dike. An inspection of the dike revealed signs of settlement and seepage in the dike and potential general failure of the embankment at several cross-sections. The section of dike (essentially, the southern ½ of the earthen embankment) with

the apparent damage and settlement was closed to vehicle traffic - this section was typically used for one-way traffic to the boat landing. The northern ½ of the dike (two-way traffic) remained open to the boat landing pending analysis of the dike structure.

The dam is considered unsafe (after inspection by dam safety engineers) and a notice was sent to the property manager on January 8, 2009 stating that plans and specifications to either repair or reconstruct the dam or to abandon and remove the dam need to be submitted to DNR by October 1, 2010 and the dam needs to be repaired or removed by December 31, 2012 (see Appendix 2). Funding was obtained in late January 2009 to hire an engineering firm to analyze the make-up and current condition of the dredge-bank dike, evaluate alternatives, and make a recommendation of what remedial action, if any, should be taken at the site. The engineering report (McMahon, August 27, 2009) on the status of the earthen dike indicated the dike is unstable and cannot withstand regular vehicle traffic. Their study concluded the minimum factor of safety for such a structure was not consistently being met along the dike even without traffic loading. Due to this, the two-way portion of road (along top of north ½ of the dike) was closed to vehicles and thus access to east the boat landing is unavailable except by foot traffic. Local officials and fisherman dispute the engineering report conclusions, and are upset with this decision and feel it negatively affects the economy of Montello and Marquette County. However, numerous residences and businesses exist downstream from the dike and a failure could cause property damage.

The engineering consultant recommended that some sort of rehabilitation would be necessary on the dike. Department staff agreed there can be no “do-nothing” option at this site. The repair options recommended by the consultant included widening the dike by adding material to the downstream side of the dike (re-enforcement) if no traffic beyond maintenance vehicles would use it, or reconstructing a wider dike with all new material having the strength to support a road and traffic.

Program staff recommended the reconstruction of the dike capable of supporting a road for light traffic for the following reasons:

- City and county officials are concerned about losing an option for emergency vehicle travel if part of Main Street (Hwy. 22) is impassible. The existing dike has been used for this in the past and reconstruction allows this option to continue.
- Vehicle travel on the dike for the public to view Buffalo Lake and to launch boats from the associated landing have become an important recreational component to the fabric of life for the community and a source of tourism dollars. The existing road has been called Sunset Drive for the popular views. The roadway is also very popular for the biking and walking public.
- Reconstruction with suitable material allows the dike to be widened toward (into) the lake and avoid the need to acquire land from three landowners plus the City of Montello. State property ownership along the dike is extremely narrow, and the dike cannot be widened on the downstream side at all and remain within state ownership. Widening the dike on the downstream side would also negatively impact wetlands and the floodplain storage capacity for the Montello River in an area where numerous residences and businesses exist.
- The reconstruction allows for improvement and continued use of a popular boat landing for Buffalo Lake. Buffalo Lake is a popular lake for fishing. Members of the community could not identify any property acquisition option in Montello for developing an alternative boat landing. Additionally, the water depths along the northeast shoreline are too shallow for a landing and the south shoreline is too steep.

- Additional, accessible shore-fishing access can be created along the dike with accessible-reserved parking available at the boat landing.

With strong local opinion and Department concurrence to maintain the Montello Dam rather than remove it, the age and condition of the entire complex making up the Montello Dam warrants additional investment into repairs or replacement of other portions of the dam as long as the earthen dike is going to be improved. Program staff also recommended replacement of the water control structure placed at the upstream end of the lock chamber and re-enforcement of the spillway structure depending on additional analysis by the selected A/E.

Purpose and Scope of the Project

The purpose of the project is to maintain (repair or replace as necessary) the Montello Dam and thus maintain the current status (lake water levels) of Buffalo Lake along with the lake's aesthetic and recreational uses. An additional purpose of the project is to retain and improve or expand upon the current public uses and recreation at the site.

The Department's land ownership is limited at the Montello Dam. Because of this and other factors described above, the dike replacement must include expanding west into Buffalo Lake because the ownership is limited to the foot-print of the dike. Other work described can be accomplished within the boundary of state ownership. It is not the intent of this project to modify the existing, permitted water levels of Buffalo Lake.

The project is important in meeting the Department's mission because it will sustain the current attributes of Buffalo Lake along with its fishing and other outdoor recreation, will provide additional outdoor recreation opportunities (shore-fishing, lake access) for everyone including disabled persons, and will carry out the public will to: 1) maintain Buffalo Lake while ensuring the dam is in good condition and not a safety concern for downstream landowners, and 2) provide vehicle access along the lake and a boat landing in Montello.

The project can be divided into the following segments:

1. Replacement of 2,523 Feet of Earth Dike

- Installation of 2,523 feet of silt fencing to protect downstream wetlands
- Removal and disposal (or re-cycling) of 2,523 feet of asphalt road
- Utilization of a portable dam and de-watering system to allow removal and replacement of the dike during an incomplete or minimal drawdown of the lake
- Removal and disposal of 25,000 cubic yards of dike including granite stone rip-rap
- Reconstruction of the dike using appropriate clay material brought to the site (2.5:1 maximum slope steepness, top width of 28 feet, maintain current top elevation)
- Install downstream toe trench/collector pipe (toe drains) to intercept and remove seepage along the dike
- Install erosion fabric mat and rip-rap along upstream slope of the dike
- Install top soil along non-rip-rap, non-road surfaces and apply grass seed, fertilizer, and mulch.

2. Development of Public Use and Recreational Facilities Related to the Dike

- Removal and disposal (or re-cycling) of existing boat launch ramp material
- Provide a 12 inch base for the ramp
- Install 2 concrete boat ramps (Both 14 foot wide by 40 foot long) and ramp shore interface
- Install one boarding dock with shore interface between the 2 ramps
- Provide a new asphalt road - Construct eight inch road base and top with three and one half inch thick asphalt pavement (2,523 feet long X 21 feet wide) to accommodate one-way vehicle traffic (heading north to south) and a multi-use lane for pedestrian and bicycle traffic. Resurface existing parking area
- Install gravel road shoulders for the length of the road (two feet wide each side)
- Install two, concrete cantilevered wharfs
- Install three fishing piers with shore interface
- Install six benches
- Install two solar lights at the boat launch area
- Install traffic control, regulatory and informational signs
- Paint parking lanes and delineation stripe for multi-use lane (pedestrians, bicycles) on road

3. Replacement/Repair of Lock Chamber, Water Control Gates

The steel sluice gates are at least 45 years old and control flow through the upstream opening of the former lock chamber. The gates are not typically operated, but are necessary to perform any draw-down of the lake to improve aquatic habitat in the lake, inspect the condition of the spillway or upstream toe of the dike, or replace the fixed-crest flash-boards on the spillway. The design of this structure is such that it is an additional spillway through the two stop-log sections when water levels exceed the elevation of the top of the stop-logs. These sections are guarded upstream by sheet piling (not reaching the bottom of the gate structure) so that floating vegetation does not collect on the stop-logs.

The current condition of this gate structure, including the gear boxes for the lift gates, is not known. The structure has become rusted and at minimum should be sanded and re-painted. But, there is a range of options for renovation of the structure up to and including replacement with a similar (or more efficient) structure depending on further analysis provided by the selected A/E. In addition to work directly related to this gate structure, at this location the project would also include removal of hardware associated with an obsolete electric carp barrier.

Because of the historic designation of the lock chamber, all work done to the gates must have no further effect to the lock than the impact of the existing gate structure.

Work on this structure would require a temporary, portable dam and dewatering system.

4. Replacement/repair of the Spillway and Abutment Walls

The rock-filled timber crib spillway was constructed in 1933, and in 1968, it was capped with concrete as well as fitted with fixed-crest flashboards. The condition of the spillway

and the abutments is not known (except as noted below). The amount of undermining caused by scour on the downstream side of the spillway is not known though the scour has been noted in dam inspection reports. A range of options for renovation of the spillway exists, from cosmetic repairs up to and including replacement with a complete new spillway structure, depending on further analysis provided by the selected A/E.

One necessary repair is to the end of the north, downstream abutment wall (grouted stone). The original wall was cut through and removed to allow a canoe portage between the upstream and downstream sides of the dam. The end of the wall has continued to deteriorate and collapse due to turbulent waters during spring run-off and flooding. The selected A/E should determine a repair to this wall that will stabilize the situation and maintain the appearance of the historic, grouted stone appearance.

Removal of accessible remnants of the obsolete electrical carp barrier at the spillway is also desirable.

Any complete re-build of the spillway should be done in consultation with the State Historic Society such that historic appearance can be combined with modern technology.

Alternatives

1. Do Nothing

Doing nothing to the dike or the remaining portions of the dam would increase the likelihood of structural failures and of a negative impact to downstream land and improvements, and would affect the lake water levels. In the evaluation and preliminary design document (McMahon, August 27, 2009) for the Montello Dam in which the earthen dike was evaluated, McMahon said: "As previously stated, the current factor of safety based on our analysis is less than the recommended amount. Therefore, we recommend a minimum of some rehabilitation take place at this location." Further, the dam is under a compliance order (DNR – January 8, 2009) to decide to abandon or reconstruct the dam by June 1, 2010 and to completely repair or remove the dam by December 31, 2012.

2. Remove the Dam

While removal of the dam (the spillway alone) might be a cheaper option (estimated at \$300,000) and provide some ecological benefits by restoring river, wetland habitat, this option may negatively affect property values and access to water for private landowners with lake homes and cottages along over 20 miles of developed shoreline. Removing the dam would make current public boat landings unusable for access to this portion of the Fox River at lower, historic Buffalo Lake water levels. Local community leaders feel this option would devastate the tourism related portion of the local economy. Marquette County and City of Montello elected leaders, local businesses, and the residents along Buffalo Lake strongly support retaining the dam and the current status of Buffalo Lake.

3. Reconstruct the Dam (and improve related public use facilities)-Preferred Alternative

The main focus of the project is to reconstruct the 2,523 feet of earthen dike that was damaged in 2008, evaluated in 2009, and found to be in need of rehabilitation. It is the condition of the earthen dike that resulted in the compliance order. This dike is over 150 years old and because of the dredge material used to construct the embankment, low soil strength within and seepage through the embankment are concerns. The inconsistency of material throughout the embankment precludes rehabilitation to only a portion of it; the entire dike should be reconstructed. Reconstruction will help safe-guard downstream property, provide an appropriate structure to support a road (for lake access and public use), and provide long-term stability to water levels in Buffalo Lake. The work activity for this option can be contained within the state ownership and the lake-bed so that additional land acquisition is not needed.

Even though the spillway and lock chamber control gates were not known to be damaged during the flood and were not identified in the compliance order, they need to be evaluated and repaired or replaced as necessary in order to complement the work on the dike and to continue the long term status of Buffalo Lake. As lake levels may need to be lowered to accommodate the dike's work, the same could be said for work on the other dam structures. Performing all of the work during the same draw-down period would be less disruptive to the community and lake use.

Reconstruction of the dike with appropriate materials allows a road to be placed on top of the dike. Having this road will restore the ability to utilize a boat landing and parking area that were incorporated into the existing dike. The project presents an opportunity to rebuild and improve the boat landing and provide additional recreational amenities that are outlined above. The road on the dike is highly desired by local elected city and county officials as an alternative route for emergency vehicles if a portion of Highway 22 (Main Street) is blocked.

Occupants and Activities

The replacement of the dike will allow long term, continued use of Buffalo Lake by anglers and pleasure boaters. Specific to the state lands, the project (dike, road, amenities) will provide the following public uses: 1) boat launching for fishing and pleasure boating, 2) shore-fishing from piers and wharfs, 3) temporary dockage for access to Montello businesses, 4) lake/wildlife-viewing by pedestrians, bicyclists, and persons in vehicles, and 5) an alternative route for emergency vehicles when needed.

The sluice gates of the lock chamber are used by Department staff to lower the lake level when needed to inspect or maintain the spillway or other dam structures or when lake management may require a drawdown of water levels. Anglers fish below these gates when water is flowing over the stop-logs. Anglers also fish below the spillway where fish that cannot move upstream because of the dam congregate.

Outline of Functional Components

Concrete boat ramp 14' X 40' (2)	560 sq. ft. (each)
Boarding dock (1)	180 sq. ft.
Accessible fishing pier (3)	300 sq. ft. (each)

Concrete, cantilever wharf 8' X 20' (2)	160 sq. ft. (each)
Concrete benches (4) 84" X 24" X 36"	4-5 persons (each)
Aluminum benches (2) 60" X 24", on fishing piers	3-4 persons (each)

All above facilities will be constructed to meet accessibility standards.

Special Considerations

1. Buffalo Lake Water Level Elevations: The project must maintain the permitted lake water levels. Formal water levels were established in 1976 requiring that during the period of October 1 through May 20, the water level shall be held below 769.13 mean sea level (MSL) and that from May 20 through October 1, water levels shall be maintained between 769.13 MSL and 769.63 MSL. Repairs or replacement made to the spillway and/or the sluice-gate/stop-log structure need to account for this and follow existing top elevations and configurations for stop-logs, flash-boards, and control gates.
2. Dewatering: Dewatering may be required between the portable dam and the work area on the dike during the removal of the existing dike material and replacement with new material. This will require a waste-water discharge permit.
3. Endangered/Threatened Species: One state-listed, Threatened fish (Pugnose Shiner) and one state-listed, Special Concern fish (Banded Killifish) may be in the Fox River immediately below the Montello Dam. The last record for the Pugnose Shiner is from 1978. The DNR Northeast Region Ecologist has advised staff to work with the local fisheries biologist to determine what management considerations for these fish are appropriate within the scope of this project. Other listed species are found within the buffer area of the project, but these species are not found in the habitat of the project site or are mobile (birds) and not reliant on the habitat of the project site.
4. Cultural Resources: Consultation with the DNR Archaeologist has determined that nearby archaeological sites (mounds, campsites, burial sites) should not be an issue due to being outside the project site. The lock chamber and portions of the spillway (abutment walls) are historic structures. As such, consultation with the State Historical Society is needed pending the level of work anticipated on these structures or their replacement. No work is proposed for the lock chamber except for: 1) removal of hardware associated with an obsolete electric fish barrier, and 2) repair or replacement of the sluice gates at the upstream end. Gate replacement may create the need to re-grout or modify the attachment of the gate structure to the chamber wall. A repair of the abutment wall is the minimum of work that may occur at the spillway, and this repair should be done in such a way to fit in to the appearance of the rest of the structure. Complete spillway replacement is a possibility and consultation with the State Historical Society would be needed to determine the appropriate compromise between modern function and historic appearance.

Federal funding may be involved for part of the project and a Tribal Historic Preservation Office review is being requested.

5. Ownership: The extent of state land at the site is very small. The downstream toe of the earth dike is the east property line. Reconstruction must stay within the state ownership. Adjacent private lands have not been identified for sale. In order to accommodate a

wider embankment, fill will be placed into Buffalo Lake. This is preferred to filling in floodplain wetlands that occur along the downstream toe of the earth dike.

6. **Water Regulation & Zoning:** The proposed work will require submittal of engineered plans and specifications to DNR staff for approval. A Type II Environmental Analysis may be required in addition to a public notice. Approximately 37 feet of lake bed could be filled for a length of 2,523 feet to accommodate the new dike (approx. 2.14 acres). This will need to be addressed in the environmental assessment and approved
7. **NEPA/WEPA:** Altering a large dam, which is the case in this project, is a Type II action under WEPA administrative rules and an environmental assessment may need to be written. This assessment could also address the NEPA compliance concerns of adverse affects on natural resources (filling on lake-bed) or adverse affects on historic structures (depending on repair needs on the spillway and lock chamber).
8. **Zoning:** The area of land adjacent to (east of) the dike is mapped flood-plain and zoned conservancy. The area of the parking lot next to the lock chamber and south to the Fox River is zoned multi-family residential and the area south of the Fox River is zoned single-family residential. The proposed project will not affect or change the zoning of the area downstream of the dam.
9. **Hazards:** An overhead electric power line runs along the northern ¾ of the dike at the property line. This line is buried for a short stretch along the dike until it runs east. No buried phone or electric lines were identified recently at each end of the dike during gate installation but the entire existing dike should be evaluated by Digger’s Hotline prior to reconstruction.

Utilities

This project does not require any new utilities. Two solar-powered lights are planned to be installed at the boat landing. Temporary relocation of an electric line and relocation of a phone cable may be necessary to complete the project. This would be at the cost of the utility companies.

Budget

Cost estimates were derived from estimates and research done by DNR Northeast Region staff (dam safety engineer and construction representative) as well as from the 2011-13 Capital Development Budget Instructions, cost-estimating workbook.

	Materials	Units	Materials Cost	Total (rounded)
<u>Site development</u>				
Additional subsurface exploration & geotechnical data				
		LS	\$50,000	\$ 50,000
Silt fence	2,523	LF	\$2.00	\$ 5,000
Road demolish	5,252	SY	\$9.42	\$ 49,500
Top soil 4"	7,008	SY	\$4.37	\$ 30,600
Grass seeding and fertilizer	7,008	SY	\$3.56	\$ 25,000
Rip rap	9,400	CY	\$72.00	\$ 676,800
Erosion mat for rip rap	7,008	SY	\$5.00	\$ 35,000

Remove existing dike	25,000	CY	\$12.57	\$ 314,300
Portable dam	2,523	LF	\$32.35	\$ 81,600
Reconstruct embankment	41,000	CY	\$13.57	\$ 556,400
Remove spillway	1	LS	\$167,000	\$ 167,000
Install new spillway	188	LF	\$2,700	\$ 507,600
Repair abutments	1,000	SF	\$8.25	\$ 8,300
Dewatering system	1	LS	\$50,000	\$ 50,000
Remove electric carp barrier	1	LS	\$10,000	\$ 10,000
Replace lock flow gates	1	LS	\$75,000	\$ 75,000
Pervious toe trench	747	CY	\$24.00	\$ 17,900
6" pipe drain	2,923	LF	\$30.00	\$ 87,700

Docks, piers, ramps

Removing existing ramp	1	LS	\$11,900	\$ 11,900
Base - 12"	41	CY	\$40.00	\$ 1,600
Concrete boat ramp 14' x 40'	2	LS	\$20,000.00	\$ 40,000
Ramp shore interface	2	LS	\$5,400.00	\$ 10,800
Boarding dock shore interface	1	LS	\$5,400.00	\$ 5,400
Boarding dock	180	SF	\$47.00	\$ 8,500
Acc. fishing pier 1	300	SF	\$47.00	\$ 14,100
Acc. F.P. 1 shore interface	1	LS	\$5,400.00	\$ 5,400
Acc. fishing pier 2	300	SF	\$47.00	\$ 14,100
Acc. F.P. 2 shore interface	1	LS	\$5,400.00	\$ 5,400
Acc. fishing pier 3	300	SF	\$47.00	\$ 14,100
Acc. F.P. 3 shore interface	1	LS	\$5,400.00	\$ 5,400
Wharf 1 - concrete cantilever	1	LS	\$12,000.00	\$ 12,000
Wharf 2 - concrete cantilever	1	LS	\$12,000.00	\$ 12,000
Signage	1	LS	\$2,500.00	\$ 2,500
Benches	6	LS	\$1,000.00	\$ 6,000
Solar lights	2	LS	\$6,000.00	\$ 12,000

Roads

8" base and 3" asphalt	2,523	LF	\$51.00	\$ 128,700
Road shoulders	900	Ton	\$8.00	\$ 7,200
Paint road/parking stall stripes	2,700	LF	\$ 0.51	\$ 1,400

Subtotal construction				\$3,066,200
Remote location				NA
Site conditions				\$ 306,600

Total Construction \$3,372,800

A/E design fee - 12% (based on similar DOT projects)	\$ 404,700
Contingency - 10%	\$ 337,300
DSF fee - 4%	\$ 148,400

Movable equipment NA

Total \$4,263,200

Operation Budget Impact

The project is not expected to impact the annual operating budget. Currently, Department work activities to maintain vegetation (dike mowing, brushing), inspect the premises, provide signage, and occasionally operate the dam are funded at adequate levels. Historically, the City of Montello had an agreement with the Department to maintain the road on top of the dike along with the boat landing. The city has indicated a similar relationship would be possible with a reconstructed facility that includes fishing piers and benches along with a new boat landing. The remaining public use facilities at the site (Andy Krakow Public Fishing Area) are not impacted directly by this project and Marquette County maintains these at county expense under a long-term agreement with the Department. Department employees to otherwise maintain this site are stationed 20 miles away. Therefore, it is desirable to maintain a working relationship with local government to operate this site for the state.

Site Plan



Montello Dam Site
Plan

Timetable

This project is written to be a decision item in the 2011-2013 biennial budget. If a draw-down of the lake is needed to do the work, it should begin in early March prior to spring run-off and remain down no more than one season with re-flooding to occur in Fall. This would depend on having ideal weather conditions through-out the work season to complete the project.

Appendix 1. McMahon Evaluation & Preliminary Design Report, August 27, 2009



McMahon August 27,
2009 Report



Slope Stability
Analysis



Plan Profile Sheets



Geotechnical Report



Remedial Repair
Analysis

Appendix 2. Dam Safety Compliance Order



Dam Safety
Compliance Order